may be covered partly by the volcanic chain (Fig. 11). Fig. 12 (profile), and Fig. 13 (surface of the same experiment) show that pulling (tearing) and pushing (folding) are *reciprocal processes*. The strata, gliding away from the highland, are torn in this district, whereas compression and folding occur in the lowland.

The surface of the strata (Fig. 13) was divided into squares of different colour (like a chess-board), so that we may see and measure directly the direction and amount of pushing and pulling in both districts. Black fissures occur at the left hand, grey folds at the right hand.

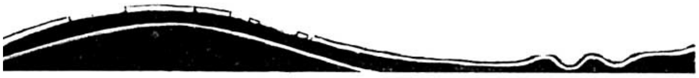
FIG. 12.

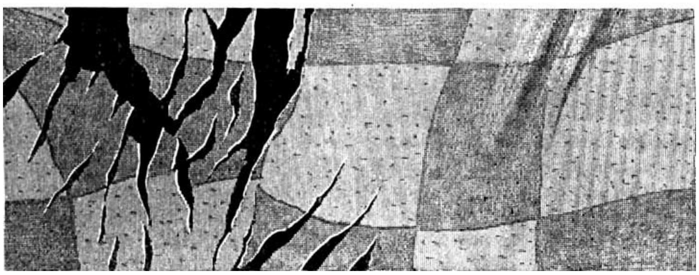
FIG. 13.

The base in this, as in the other cases, was rigid; there occurred *no compression in the depth*, yet folding succeeded in the gliding strata.

Folding, according to my opinion, does not depend on a contraction of our planet, but is a simple gliding phenomenon. E. REYER.

NOTES.

AT the meeting of Section A of the British Association on Monday, August 8, there will be a discussion on the subject of a National Physical Laboratory. The discussion will be opened by Prof. Oliver J. Lodge, F.R.S.

THE Academy of Sciences at Berlin has conferred upon Lord Kelvin one of the first four Helmholtz gold medals.

THE French Association for the Advancement of Science will hold its twenty-first meeting at Pau from September 15 to 22.

THE Council of University College have accepted a tender for the erection of new technical laboratories for the practical teaching of mechanical and electrical engineering. Care has been taken that the buildings shall accord with all the conditions of modern teaching, but of course it is necessary that provision shall also be made for an adequate supply of apparatus and plant. The part of the proposed laboratory which is to be set apart for electrical engineering cannot be properly fitted up for a sum of less than £2010, and Prof. Fleming has issued an appeal to all who may be able and willing to help him in obtaining this amount. In the course of his appeal he says: "The Council do not at present see their way to incur this additional expenditure over and above the cost of the buildings, and yet it is absolutely essential to the completion of the project. The Council have, therefore, by a minute of their proceedings of May 7, 1892, recommended this very essential part of the proposed work to the notice and liberality of those who may be disposed to help. Thus sanctioned and authorized by the Council, the Professor of Electrical Engineering begs permission to bring under your notice the necessity for a special Electrical Apparatus Fund, and desires to invite your aid in the formation of such a fund of £2010, to be entitled 'The University College Electrical Engineering Apparatus Fund.'" Prof. Fleming is anxious that the sum should, if possible, be obtained within the next six months. Donations should be sent to the Secretary of University College, marked "Electrical Apparatus Fund."

THE services rendered by the late Sir William Macleay to the Linnean Society of New South Wales and to science in general are to be commemorated by the publication of a memorial volume. This was decided recently at a general meeting of the New South Wales Linnean Society. It is proposed that, in addition to a portrait and memoir of Sir William Macleay, the volume shall consist of original papers on those branches of science in the advancement of which he was especially interested—zoology, ethnology, botany, and geology. Promises of papers have already been received from Sir F. von Mueller, Prof. Hutton, Prof. J. Parker, Prof. Baldwin Spencer, and other leading Australian biologists. It is intended that, as regards "style of get up and illustration," the volume shall be fully worthy of the occasion. The expense is to be met by means of a public subscription. Every ordinary member of the Society subscribing one guinea or upwards, and any non-member subscribing two guineas or upwards, to the memorial will receive a copy of the volume. At the meeting of the Society on May 25, the President announced that a number of subscriptions had been received in answer to a circular issued a few weeks previously. It was necessary, however, he said, that a considerably larger sum should be collected before the Council would be in a position to proceed with the work.

THE Governors of the Merchant Venturers' School, Bristol, have elected to the vacant Lectureship in Biology Mr. G. P. Darnell-Smith, B.Sc., assistant to Dr. W. Marcet at University College, London. Mr. Smith is a student of University College, and graduated with honours in botany and zoology in 1891.

THE thunderstorms which we referred to in our last issue gave a very decided, but temporary, check to the temperature, the highest day readings falling about 20° after the storm; and the heavy rains which accompanied the disturbed weather have materially lessened the deficiency of rainfall, which has been so characteristic a feature for some months past. By the end of last week the temperature had recovered, and the weather became very fine in the southern parts of the kingdom, the maxima reaching from 80° to 85° at some inland stations on Sunday; while conditions remained unsettled, with heavy rain, in the north and west, owing to a cyclonic area which passed along the Irish coast, and caused a thunderstorm on the east coast. During the last day or two, depressions have passed to the northward of our islands, again causing unsettled weather, with rain in most parts; while the westerly winds have increased considerably in strength, reaching the force of a gale on our north-west coasts.

The *Weekly Weather Report* issued on the 2nd instant shows that the rainfall differed very considerably in various parts; in most of England, the north and west of Scotland, and in Ireland, the amount exceeded the mean. The greatest deficiency on the amount due from the beginning of the year is over the midland, south, and south-west of England, and the west of Scotland, the amounts varying from about 3 to 7 inches. Bright sunshine exceeded the average amount for the week, except in the north-western and south-western districts.

THE Washington Weather Bureau has recently issued a report on its work for the last six months of the year 1891, dealing more with the scientific and practical work of the Department than with the administrative duties, which were referred to in a special report issued in October last (NATURE, vol. xlv. p. 86). Prof. Harrington states that an endeavour has been made to improve the weather forecasts in every possible way; the time covered by the forecasts has been extended to thirty-six hours, and longer in some cases. Every effort is made to distribute the information as widely as possible, and for this purpose the telephone is becoming more popular, and will possibly eventually supersede the telegraph. Increased interest has of late been manifested in regard to meteorological education in the United States, and a list is given of the institutions which announce definite courses of instruction. A very large accumulation of data is now in the possession of the Weather Bureau; a summary of these, under each element, is given in the report, and it is proposed to utilize the materials by special studies to be undertaken by the officers of the Bureau. The study of terrestrial magnetism in connection with meteorology, with the object of discovering some physical relations connecting them, has from time to time been made by various persons, but, on the whole, it has not led to definite results. Prof. Harrington states, however, that the subject is now being specially investigated by Prof. F. H. Bigelow, one of the meteorologists of the Bureau, and that such progress has been made as to render it quite certain that they are intimately associated. By the method of analysis now being used by Prof. Bigelow, which differs from that hitherto employed, it is stated that he has been able to disentangle several of the magnetic fields surrounding the earth, which are observed in the magnetic curves as an integrated effect.

ACCORDING to the *Pioneer Mail*, the Port Officer of Mangalore reports that a native craft was overtaken by heavy weather and made for Mangalore, where there is a bad bar with about eight feet of water in it. A tremendous sea was breaking over the bar, so, before crossing it, and while running in, the native skipper opened one oil cask, forming a part of the cargo, and scattered it all round in the sea plentifully, with the result that he took his craft across the bar safely, and so saved the vessel and the cargo. The vessel's name was *Mahadeprasad*, and she was of 95 tons, bound from Cochin to Bombay. This is said to be the first case on record of a native tindal who has successfully used the oil in troubled waters.

MR. H. ROWLAND-BROWN, writing in the current number of the *Entomologist*, says that when sitting in the Temple Gardens on June 22 he saw a fine male *Colias edusa* fly across the lawn. The excitement among the sparrows was "simply immense," but the butterfly "proved a match for his innumerable pursuers, and sailed calmly over the railings towards the City." The editor of the *Entomologist* adds a note to the effect that this species was seen in London in 1877, which is remembered as the great "*edusa* year."

A FACT noted in the current number of the *Zoologist* gives a very vivid idea of the depth of snow and drift in the north of Scotland last winter. In the parish of Lairg, a month or two after the first thaw set in, two full-grown stags were found dead in a hollow in a "burn." The first thing one of the keepers saw was a stag's antlers above the snow. These he took for the branch of a tree, but on going near he found that a stag had been smothered by the drifting snow while standing on its feet. A week or so afterwards, when more of the snow was melted, another stag was discovered. This one had been smothered while lying down. He was close to his comrade.

THE Peabody Museum has issued, in its series of archæological and ethnological papers, an interesting report on pile-structures in Naaman's Creek, near Claymont, Delaware, by Dr. H. T. Cresson. These pile-structures are believed to be remains of prehistoric fish-weirs.

THE Chicago Exhibition will include what promises to be a very important department for the exhibition of objects relating to ethnology, archæology, history, and cartography. A special bureau connected with the department will represent the history of the Latin-American Republics, and include all relics of the time of Columbus. There will also be a group of "isolated and collective exhibits." A full account of the plan of the department, and of the classification of the exhibits, has been prepared by Mr. F. W. Putnam, chief of the department. By means of special research in different parts of America, under Mr. Putnam's direction, important scientific collections in the ethnological and archæological sections will be brought together. It is hoped that every State Board and many historical and scientific Societies, as well as owners of private collections, will do what they can to contribute to the success of the department, so that it may present a full and effective illustration of the present status of American archæology and ethnology.

MESSRS. MITCHELL AND HUGHES have issued the Transactions of the County of Middlesex Natural History and Science Society for the sessions 1889-90 and 1890-91. The volume contains papers on rabies—its natural history and the means of extinguishing it, by Arthur Nicols; the best means of examining Rotifers under the microscope, by C. Rousselet; the tubercle bacillus, by A. W. Williams; and "A Night among the Infinities," with a description of the instruments at Stanmore Observatory, by Sydney T. Klein.

THE July number of *Natural Science* opens with some "Notes and Comments," and contains articles on "The Story of Olenellus," by Prof. G. A. J. Cole; the physical features of the Norfolk Broads, by J. W. Gregory; the evolution of flatfish, by Prof. A. Giard; is Stigmaria a root or a rhizome? by T. Hick (with "A Reply," by Prof. W. C. Williamson, F.R.S., and "A Rejoinder," by T. Hick); agricultural museums, by J. H. Crawford; and amber and fossil plants, by A. C. Seward.

A PAPER on three deep wells in Manitoba, by Mr. J. B. Tyrrell, was lately submitted to the Royal Society of Canada, and has now been printed in the Transactions. It contains a good deal of interesting and well arranged geological information.

MR. D. J. MACGOWAN, writing in the *Shanghai Mercury*, gives an account of some remarkable statements made by a group of Chinese traders who lately undertook a mercantile exploration of the interior of Southern Formosa. They started from Lamalan, which Mr. Macgowan takes to be Chockeday of the charts, and in seven days reached their objective point, Hualin Stream. They lodged in stone caverns, and the chattering of monkeys and the sounds of insects seemed to them "appalling and indescribable." The region was so "weird" that it reminded them of "legends of the kingdom of hobgoblins." Among the trees were some of "prodigious girth, forming a vast forest." These trees are said to measure more than ten outstretched arms. A tree said to flourish in the same forest is described as bearing "flowers, red and white, which are larger than a sieve, and of extraordinary fragrance." Mr. Macgowan adds:—"Mr. Taylor, while searching for orchids, heard of these majestic trees and huge flowers, which he inferred, from what natives said, were epiphyte orchids. I am moved to make known this sylvan discovery in the hope that, pending the exploration of this *terra incognita* by our botanists, Dr. Henry or Mr. Ford, residents in Formosa, will take measures to provide those naturalists with specimens of flowers, seeds, leaves, and bark of the trees concerning which the Chinese have excited our curiosity."

IN a capital address on "tooth culture," delivered at the annual meeting of the Eastern Counties Branch of the British Dental Association, and printed in the current number of the *Lancet*, Sir James Crichton-Browne referred to a change which has taken place in bread, as one of the causes of the increase of dental caries. So far as our own country is concerned, this is essentially an age of white bread and fine flour, and it is an age therefore in which we are no longer partaking, to anything like the same amount that our ancestors did, of the bran or husky parts of wheat, and so are deprived to a large degree of a chemical element which they contain—namely, fluorine. The late Dr. George Wilson showed that fluorine is more widely distributed in nature than was before his time supposed, but still, as he pointed out, it is but sparingly present where it does occur, and the only channels by which it can apparently find its way into the animal economy are through the siliceous stems of grasses and the outer husks of grain, in which it exists in comparative abundance. Analysis has proved that the enamel of the teeth contains more fluorine, in the form of fluoride of calcium, than any other part of the body, and fluorine might, indeed, be regarded as the characteristic chemical constituent of this structure, the hardest of all animal tissue, and containing 95·5 per per cent. of salts, against 72 per cent. in the dentine. As this is so, it is clear that a supply of fluorine, while the development of the teeth is proceeding, is essential to the proper formation of the enamel, and that any deficiency in this respect must result in thin and inferior enamel. Sir James Crichton-Browne thinks it well worthy of consideration whether the reintroduction into our diet of a supply of fluorine in some suitable natural form—and what form, he asks, can be more suitable than that in which it exists in the pellicles of our grain stuffs?—might not do something to fortify the teeth of the next generation.

THE recent publication is announced of the first number of a new monthly journal under the title *Rivista di patologia vegetale*. It is edited by Sigg. A. N. and A. Berlese, and published at Avellino, in Italy; and is to be devoted to the study of animal and vegetable parasites infesting cultivated plants, to the diseases which they cause, and the remedies employed to combat them.

DR. H. C. CHAPMAN contributes to the latest instalment of the Proceedings of the Academy of Natural Sciences, Philadelphia, a paper describing observations on the brain of the gorilla. He says that while the fissures and convolutions are disposed in the brain of the gorilla in the same manner, generally speaking, as in that of man or of the chimpanzee or orang, it is nevertheless a low type of brain, being much less convoluted than the brain of man or of either of the two other anthropoids. If it were permissible, in the absence of living links or sufficient fossil remains, to speculate upon the development of man and the anthropoids from lower forms of simian life, Dr. Chapman thinks it might be inferred from the character of the brain that the gorilla had descended from some extinct *Cynocephalus*; the chimpanzee and orang from extinct macaque and gibbon-like forms; and man from some generalized simian form combining in itself the characteristics of existing anthropoids.

AT the annual meeting of the Department of Electricity of the Brooklyn Institute of Arts and Sciences on June 1, Prof. E. J. Houston delivered a lecture on recent advances in the applications of electricity. Turning for a moment from the past to the future, Prof. Houston said it was related of Faraday that when asked his opinion of the future of the electric motor, he put up his cane and stopped it. That was Faraday's opinion. Prof. Houston's view was more favourable. The true efficiency of a triple expansion steam engine, he said, did not exceed 17 per cent. as a maximum. With the electric motor we could already get an efficiency of from 90 to 95 per cent., but it was to-day dependent on the steam-engine. A cheaper method would be devised for generating currents, and he believed there were now those living who would see the steam-engine relegated to the scrap heap. Possibly the motor of the future would be operated by thermo-electricity. Possibly a means would be devised of converting the latent energy of coal directly into potential electrical energy. He believed in the successful solution of the problem of aërial navigation in the near future. He was confident that ere long our present methods of electric illumination, in which 97 to 98 per cent. of the energy was expended in useless heat rays, would be supplanted by one in which the order was reversed—in which 97 to 98 per cent. would be converted into light, and but 2 to 3 into heat. And finally, he believed the time was near at hand when electro-therapeutists, instead of regarding the human body as a vehicle for electricity, would regard it as a source of electricity. They would then make their diagnoses with the voltmeter, the ammeter, and the condenser, and the result would then be definite, instead of, as at present, "hit or miss."

THE *Mediterranean Naturalist* quotes a statement made by the late Rev. H. Seddall, who was many years a resident of Malta, as to a curious form of industry formerly practised by the Maltese. "Five species of *Pinna*," wrote Mr. Seddall, "are found in Malta, some of them common in the harbours within reach of a boat or a pole hook. They project from the mud amongst the Zostera roots, to which they are attached by their silken cable. Of this silk, which is of fine texture, but heavy, I have seen gloves made."

THE additions to the Zoological Society's Gardens during the past week include a Palm Squirrel (*Sciurus palmarum*) from India, presented by Miss Daisy Fox; a Common Roe (*Capreolus capræa* ♂), European, presented by Mr. E. J. H. Towers; a Tawny Owl (*Syrnium aluco*), European, presented by Mr. Leigh Robinson; a Bronze Fruit Pigeon (*Carpophaga ænea*) from India, presented by Mr. J. L. Shand; a Tuberculated Tortoise (*Homopus femoralis*), a Tent Tortoise (*Testudo tentoria*), two Fisk's Tortoises (*Testudo fiski*), a Robben Island Snake (*Coronella phocarum*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; two Green Lizards (*Lacerta viridis*), European, three Viperine Snakes (*Tropidonotus viperinus*) from North Africa, presented by the Rev. F. M. Haines; a Common Chamelon (*Chamæleon vulgaris*) from North Africa, presented by Mr. Samuel L. Bensusan; a Water Viper (*Cenchris piscivora*) from North America, presented by Mr. Ernest Brewerton; a —— Zorilla (*Zorilla typica*), a Grey Monitor (*Varanus griseus*) from Egypt, a Stanley Parrakeet (*Platycercus icterotis*) from Australia, deposited; two Asiatic Wild Asses (*Equus onager* ♂ ♀) from South-west Asia, received in exchange; four Wapiti Deer (*Cervus canadensis* ♂ ♀ ♀ ♀) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE RED SPOT ON JUPITER.—M. J. J. Landerer, in *Bulletin Astronomique* (tome ix., June), gives the results of his measurements of the dimensions and Jovicentric latitude of the red spot on Jupiter. The method he adopted was to make use of the transit